

GLOBAL CLIMATE HIGHLIGHTS

MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF AUGUST 31, 1991

1. Alaska:

SIZEABLE PRECIPITATION DEFICIENCIES DEVELOP.

Four weeks featuring 50% or less of normal precipitation have been observed across northern, western, and eastern sections of the state. The eastern tier has been most severely affected by the dry spell as less than one-quarter of normal precipitation has fallen since mid-July [6 weeks].

2. Central and East-Central United States:

PROLONGED DRY SPELL CONTINUES.

Isolated moderate (35-65 mm) rains fell on western Ohio, central and eastern Indiana, central Illinois, and central and southern Iowa while little or none was again reported across eastern Iowa, northern Illinois, southern Indiana, most of Ohio, Pennsylvania, West Virginia, and Maryland. Since mid-July, deficits of 50-100 mm have accumulated throughout the region except through northern Indiana, where rainfall has been only slightly below normal (see front page) [14 weeks].

3. South-Central and Southeastern United States:

WET WEATHER SHIFTS EASTWARD.

Drier weather brought an end to moisture surpluses across the Southwest and southern High Plains, but abnormally wet conditions continued across much of Texas and expanded eastward into the lower Mississippi Valley and Deep South. Most locations measured 50-125 mm, with portions of the southern Appalachians, southeastern Louisiana, central Arkansas, and east-central Texas reporting 165-210 mm (see United States Weekly Climate Highlights for more details) [9 weeks].

4. Central and Western Europe:

ABNORMAL DRYNESS AFFLICTS LARGE PORTIONS OF EUROPE.

Little or no rain fell across the region, except for a small portion of southwestern France that measured 20-45 mm. During the last few weeks, only pockets of moderate rainfall have been observed, generating deficits of 50-110 mm in most locations. Spotty locations across Germany and the Netherlands have recorded somewhat larger deficits (110-150 mm) while sizeable deficiencies of 205-250 mm have accumulated in the higher elevations across the Swiss Alps [4 weeks].

5. Southeastern Europe:

MOISTURE SURPLUSES DECLINE.

Light to moderate rainfall (20-50 mm) fell across northeastern Romania, Moldavia, and adjacent sections of the Ukraine while little or none was measured elsewhere, bringing an end to the recent wet spell [Ended after 6 weeks].

6. Northern Senegal and Southwestern Mauritania:

RAINFALL SHORTAGES PERSIST.

Despite 15-35 mm of rain, many locations continued reporting six-week deficits of 80-150 mm [13 weeks].

7. Northwestern India and Eastern Pakistan:

BELOW NORMAL RAINFALL AGAIN REPORTED.

Light rain (20-40 mm) dampened parts of northeastern Pakistan and adjacent India, but only 10-20 mm fell farther south, keeping moisture deficiencies intact. Many stations have received 60-155 mm of normal rainfall since mid-July despite periods of inundating rain and flooding farther east [7 weeks].

8. Southeastern Asia:

AN EXCEPTIONALLY WET MONTH.

Most of northern and eastern Thailand recorded 100-300 mm while spotty totals of 100-500 mm deluged the Isthmus of Kra. Rainfall generated severe flooding in southern and western Cambodia where reliable data are unfortunately lacking (see page 6). In mid-July, up to 1450 mm has fallen on portions of Thailand and locations have received 100-200 mm above normal rainfall during the period, but isolated locations reported much larger surpluses of 915 mm [4 weeks].

9. Southeastern Soviet Union:

ANOMALOUSLY HEAVY RAIN CEASES.

Only scattered rains of 10-30 mm were reported, ending the wet spell [Ended after 13 weeks].

10. Eastern China:

SIGNIFICANT RAINFALL SHORTAGES DEVELOP.

Four consecutive weeks of unusually light rain has allowed moisture deficits, formerly confined to Taiwan and coastal Fujian Province, to spread rapidly northward across much of eastern China. Only scattered light to moderate rains (30-800 mm) fell across the Yangtze Valley and the provinces of Shandong, Shanxi, Hebei, and Tianjin the period, with other areas recording little or none. Since late July, shortfalls of 50-150 mm have developed throughout the region and slightly higher deficits (150-225 mm) reported in the northern Yangtze River Valley [4 weeks].

11. Luzon:

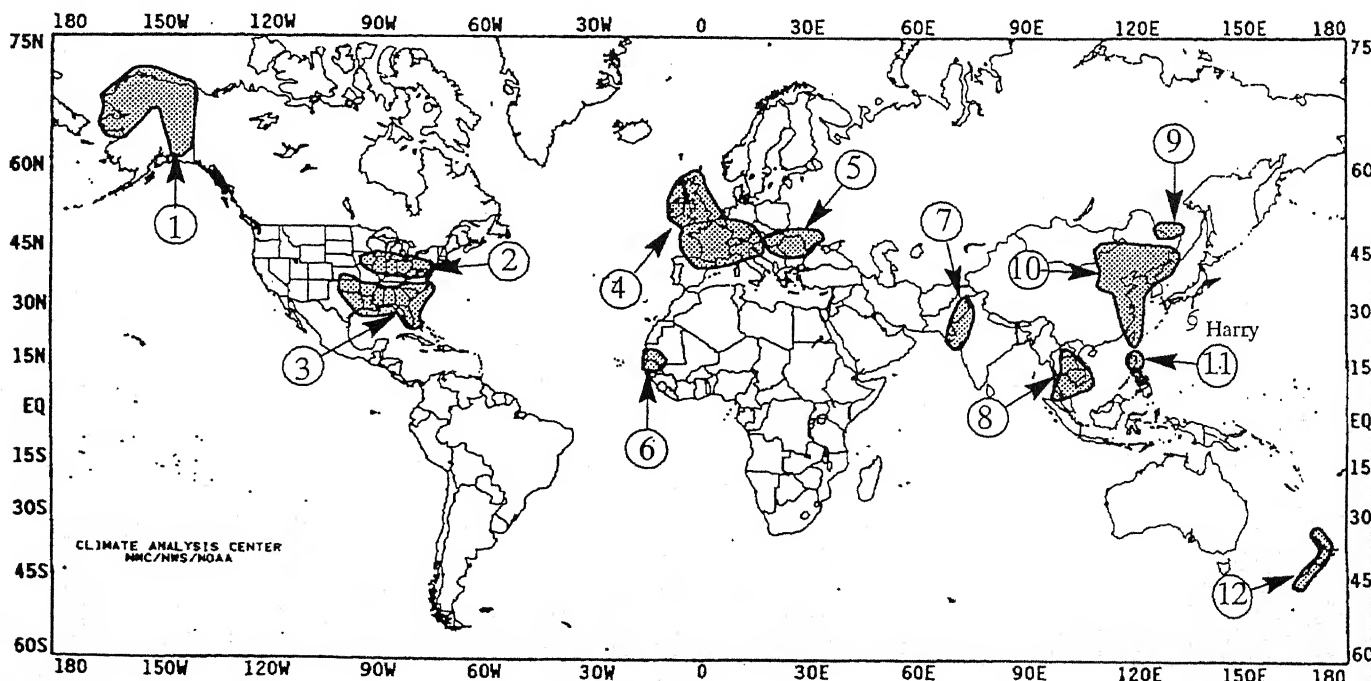
RAINFALL TOTALS DIMINISH SLIGHTLY.

Most of the island observed 80-300 mm of rain, with only light to moderate totals (20-70 mm) measured along the northern and western tiers of Luzon. Since mid-July, 120-305 mm more than normal has accumulated at many locations [7 weeks].

12. Northwestern New Zealand:

MODERATE PRECIPITATION REPORTED.

The western half of North Island and the northeastern half of South Island recorded 20-50 mm of precipitation, allowing accumulated surpluses to decrease slightly. Despite the lower totals, 60-310 mm above normal rainfall has fallen since mid-July [7 weeks].



EXPLANATION

TEXT: Approximate duration of anomalies is in brackets. Precipitation amounts and temperature departures are this week's values.
 MAP: Approximate locations of major anomalies and episodic events are shown. See other maps in this Bulletin for current two week temperature anomalies, four week precipitation anomalies, long-term anomalies, and other details.

UNITED STATES WEEKLY CLIMATE HIGHLIGHTS

FOR THE WEEK OF AUGUST 25 – 31, 1991

A late summer heat wave baked parts of the Great Plains, upper Midwest, and New England while unseasonably warm weather afflicted the remainder of the eastern two-thirds of the nation. Nearly two dozen record highs were established from the Rockies to northern New England. Readings approaching 110°F affected parts of South Dakota while triple-digit highs were recorded as far north as southern Saskatchewan. Farther east, high humidities and temperatures produced uncomfortable apparent temperatures in the Great Lakes and mid-Atlantic. The sizzling heat pushed the mercury at Philadelphia, PA to a daily record high of 92°F on Saturday, which also marked the 49th day this year the temperature has equaled or exceeded 90°F, tying the record established in 1988. Late in the day, temporary relief from the heat came in the form of thunderstorms. Strong storms inundated parts of the southern tier of states with brief and heavy rain. Over half a foot of rain fell on eastern Texas, central Arkansas, southeastern Louisiana, and northern Georgia, causing localized flooding (Figure 1). New Orleans, LA measured nearly 6 inches during the week, pushing the yearly total through August to over 92 inches. At the same time, 4 inches of rain fell at Shreveport, LA, producing the third wettest August on record with 9.25 inches. Elsewhere, strong thunderstorms inundated White and Habersham counties in Georgia, flooding several roads and bridges. In contrast, little rain fell in Ohio which has suffered from severe to extreme drought conditions this summer. On Tuesday, the Federal Government declared all 88 counties in the state as disaster areas, making them eligible for federal assistance.

As the week began, high pressure off the East Coast dominated weather conditions from the Rockies to the Eastern Seaboard. A southerly flow on the western side of the high produced temperatures up to 20°F above normal in the northern Plains and Great Lakes. Readings soared over the century mark in the Dakotas Sunday through Tuesday. Over a dozen record daily highs were reported in the northern Plains and upper Midwest, including Huron, SD with 106°F on Sunday. Farther south, moist flow off the Gulf of Mexico fueled thunderstorms across the Deep South. Slow-moving storms dumped heavy amounts of rain, with as much as 3 inches falling at New Orleans, LA on Tuesday. Elsewhere, severe thunderstorms produced wind gusts up to 65 mph, downing trees and power lines near Grantsburg, Wisconsin. Farther west, unusually cool weather dominated the Pacific Northwest. Record daily lows were reported in Washington and Oregon as lows dipped into the thirties. In addition, heavy rains soaked coastal Washington, with up to 2.5 inches at Quillayute, WA on Tuesday, as a cold front moved onshore.

During the last half of the week, the heat in the central U.S. shifted slowly to the east while a cold front trekked into the middle of the country. Record daily highs were observed in the Ohio Valley, New England, and the mid-Atlantic as the mercury approached 100°F. New York City/Central Park topped the 90°F mark for the

37th time this year, tying the record established in 1944. The heat combined with high humidities to produce oppressive conditions in the mid-Atlantic. Farther west, strong thunderstorms developed over the nation's mid-section, with copious amounts of rain accompanying some storms. Wichita, KS was inundated with nearly 4.5 inches of rain on Wednesday and Thursday. Flash flooding resulted along the Oklahoma-Kansas border near Pratt, KS after 3 inches of rain fell in 1 1/2 hours. Severe thunderstorms across the Deep South dumped 5 inches of rain on Louisiana while wind gusts up to 70 mph downed trees and power lines in Oklahoma and Mississippi. Severe weather also affected parts of the Ohio Valley, New England, and mid-Atlantic, downing trees and power lines. Elsewhere, hot weather returned to portions of the northern Plains and Rockies by Saturday with readings soaring once again to the century mark in Montana.

According to the River Forecast Centers, the greatest weekly totals (more than 2 inches) occurred across the southeastern quarter of the country and scattered locations in northern New England, the Ohio Valley, along the Pacific Northwest Coast, in extreme southeastern Alaska, and eastern Hawaii (Table 1). Light to moderate amounts fell on northern New England, southern and western sections of the Ohio Valley, most of Texas, central Plains and Rockies, the Southwest, western Oregon and Washington, and most of southern Alaska. Little or no precipitation was measured in southern New England, the eastern Ohio Valley, Great Lakes, upper Midwest, northern Great Plains, northern and southern Rockies, the Far West, the northern half of Alaska, and the remainder of the Hawaiian Islands.

Abnormally warm weather enveloped the nation east of the Great Basin (Table 2). Weekly departures between +10°F and +15°F were observed from the northern Rockies to the Great Lakes, establishing numerous daily record highs as readings topped 100°F. Departures of +4°F to +9°F were common from parts of the Intermountain West to the Atlantic Seaboard. Near to slightly above normal temperatures were limited to the southern Atlantic Coast, the Rio Grande Valley, and portions of the Southwest and Great Basin. In Alaska, only a few scattered locations reported significantly warmer than normal conditions, while near to slightly above normal readings were measured in the extreme southern and northern portions of the state.

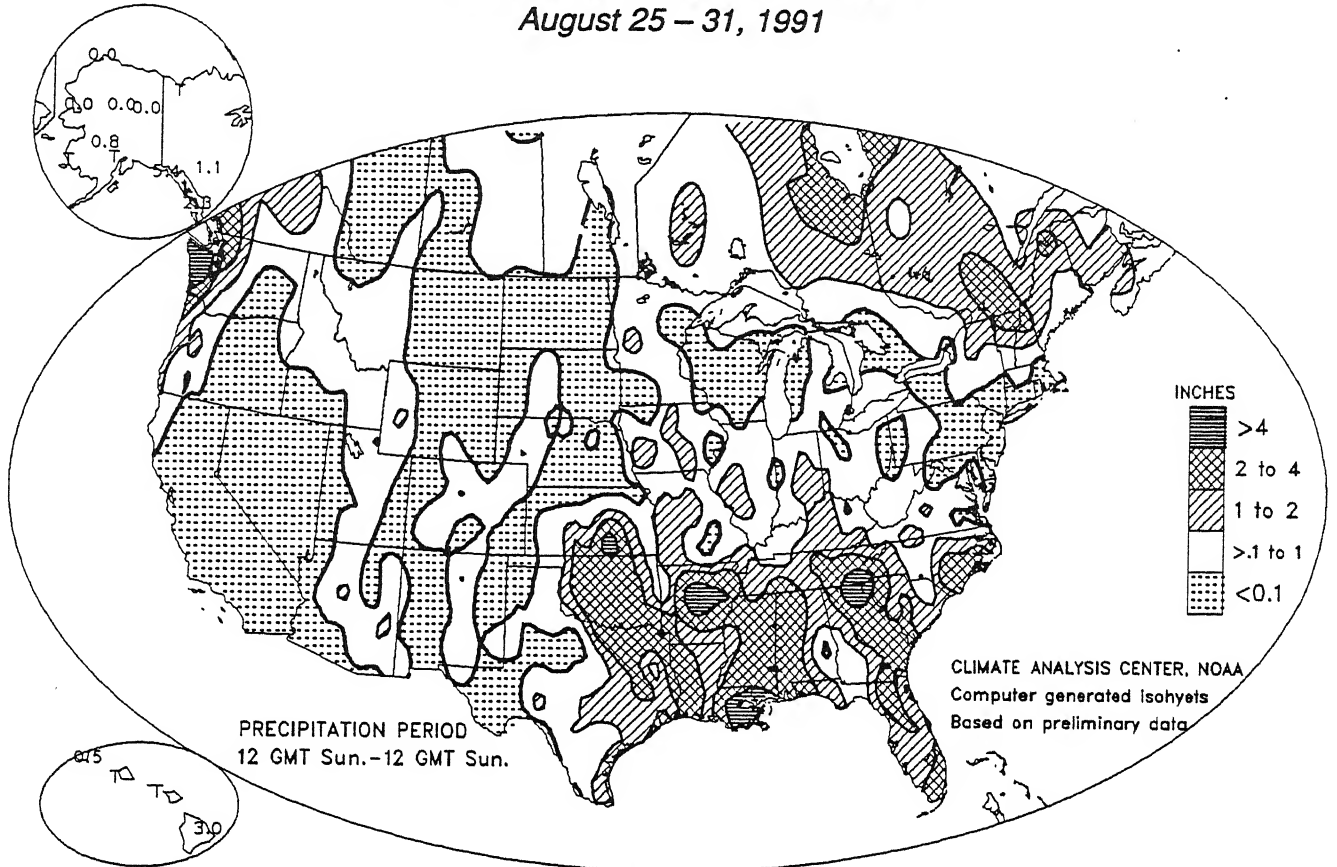
In contrast, cooler than normal conditions were limited to the Far West and parts of the south-central U.S. (Table 3). Weekly departures between -3°F and -5°F were reported across California and southern Oklahoma while near to slightly below normal temperatures affected most of the western Gulf Coast and lower Mississippi Valley. Unseasonably cool conditions covered most of Alaska with the exception of the aforementioned areas. Weekly departures of -8°F were observed in eastern Alaska while departures between -3°F and -7°F were recorded elsewhere.

TABLE 1. SELECTED STATIONS WITH 3.00 OR MORE INCHES OF PRECIPITATION DURING THE WEEK OF AUGUST 25 – 31, 1991

STATION	TOTAL (INCHES)	STATION	TOTAL (INCHES)
QUILLAYUTE, WA	9.10	MT. WASHINGTON, NH	3.92
LITTLE ROCK, AR	7.37	SAVANNAH, GA	3.63
NEW ORLEANS NAS, LA	6.33	ANNETTE ISLAND, AK	3.57
WICHITA/MCCONNELL AFB, KS	6.06	JONESBORO, AR	3.56
NEW ORLEANS/MOISANT, LA	5.88	HUNTSVILLE, AL	3.54
WICHITA, KS	5.61	BIRMINGHAM, AL	3.33
BILOXI/KEESLER AFB, MS	5.60	SITKA, AK	3.31
YAKUTAT, AK	5.40	MILTON/WHITING NAS, FL	3.26
LITTLE ROCK AFB, AR	5.16	VERO BEACH, FL	3.14
CHERRY POINT MCAS, NC	5.00	COLUMBUS AFB, MS	3.06
MUSCLE SHOALS, AL	4.18	ORLANDO, FL	3.02
SHREVEPORT, LA	4.00	HILO/LYMAN, HAWAII, HI	3.00
MERIDIAN NAS, MS	3.95		

OBSERVED PRECIPITATION

August 25 – 31, 1991



DEPARTURE OF AVERAGE TEMPERATURE FROM NORMAL (°F)

August 25 – 31, 1991

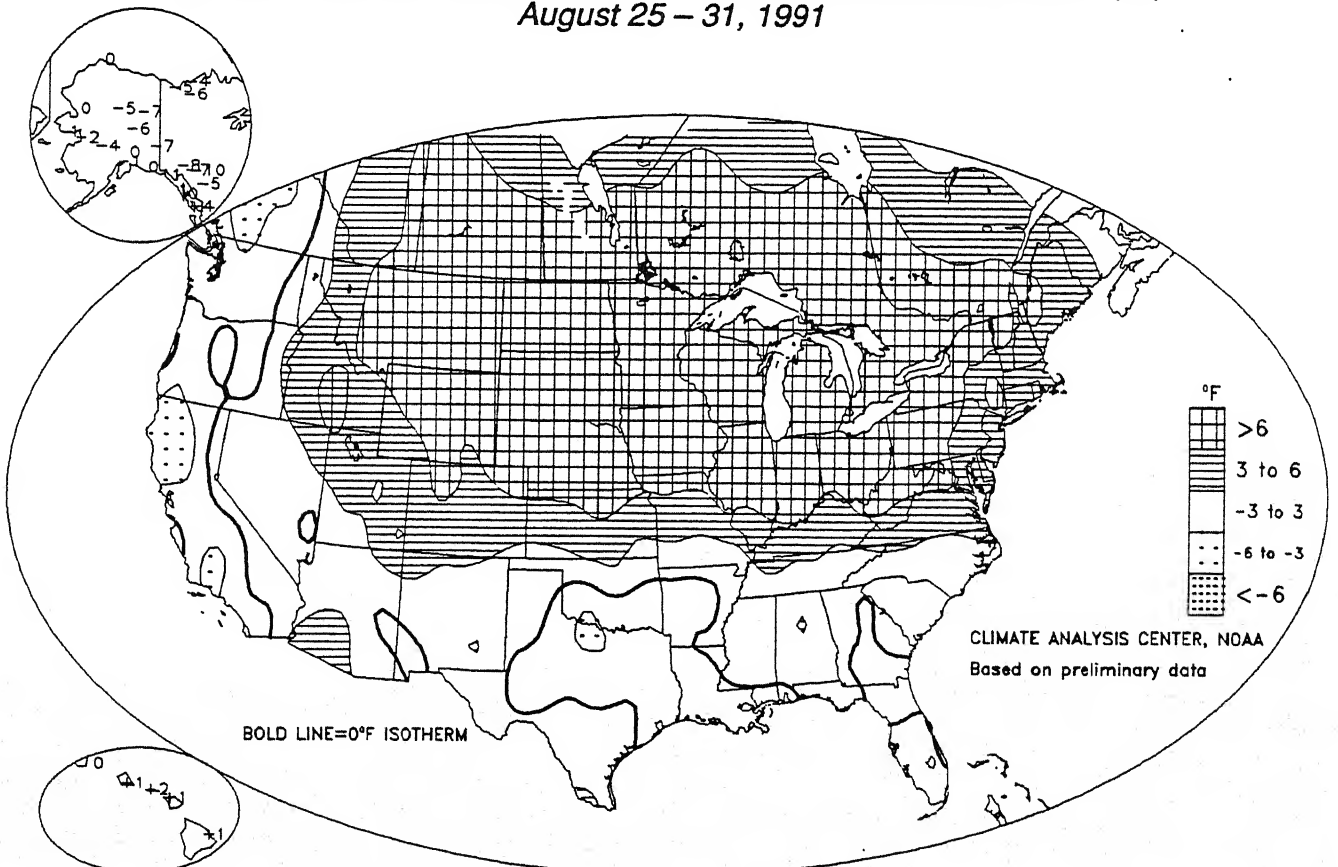


TABLE 2. SELECTED STATIONS WITH TEMPERATURES AVERAGING 12.0°F OR MORE ABOVE NORMAL FOR THE WEEK OF AUGUST 25 - 31, 1991

STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
MARQUETTE, MI	+14.2	74.1	MILWAUKEE, WI	+12.5	80.1
PELLSTON, MI	+13.9	75.4	GLASGOW, MT	+12.5	78.4
PIERRE, SD	+13.8	84.3	GRAND FORKS, ND	+12.5	76.4
EAU CLAIRE, WI	+13.7	79.2	SAULT STE. MARIE, MI	+12.5	73.3
BISMARCK, ND	+13.6	79.1	SIOUX FALLS, SD	+12.4	81.1
JAMESTOWN, ND	+13.6	78.5	FARGO, ND	+12.4	78.2
HANCOCK/HOUGHTON, MI	+13.4	74.0	WILLISTON, ND	+12.4	77.7
DULUTH, MN	+13.2	73.6	RAPID CITY, SD	+12.3	80.8
INTERNATIONAL FALLS, MN	+13.1	73.1	DICKINSON, ND	+12.3	77.2
HURON, SD	+12.8	81.5	PARK FALLS, WI	+12.2	74.1
TRAVERSE CITY, MI	+12.8	77.8	ST. CLOUD, MN	+12.1	76.9
ABERDEEN, SD	+12.7	80.0			

TABLE 3. SELECTED STATIONS WITH TEMPERATURES AVERAGING 3.0°F OR MORE BELOW NORMAL FOR THE WEEK OF AUGUST 25 - 31, 1991

STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
GULKANA, AK	-8.0	42.7	MCGRATH, AK	-4.1	47.3
NORTHWAY, AK	-7.4	43.0	BIG DELTA, AK	-4.0	48.3
FAIRBANKS, AK	-6.4	46.6	SAN DIEGO/LINDBERGH, CA	-3.4	68.6
BETTLES, AK	-5.5	45.9	FT. SILL/HENRY POST AAF, OK	-3.4	78.0
REDDING, CA	-5.5	74.1	ILIAMNA, AK	-3.2	49.0
RED BLUFF, CA	-5.1	73.4	MEACHAM, OR	-3.1	57.0
KETCHIKAN, AK	-4.5	53.2	STOCKTON, CA	-3.1	72.1
SEXTON SUMMIT, OR	-4.5	57.6	MARYSVILLE/YUBA, CA	-3.1	72.5
BAKERSFIELD, CA	-4.4	76.4	STAMPEDE PASS, WA	-3.0	51.3
BLUE CANYON, CA	-4.3	61.4	SACRAMENTO, CA	-3.0	70.9
UKIAH, CA	-4.2	67.9			

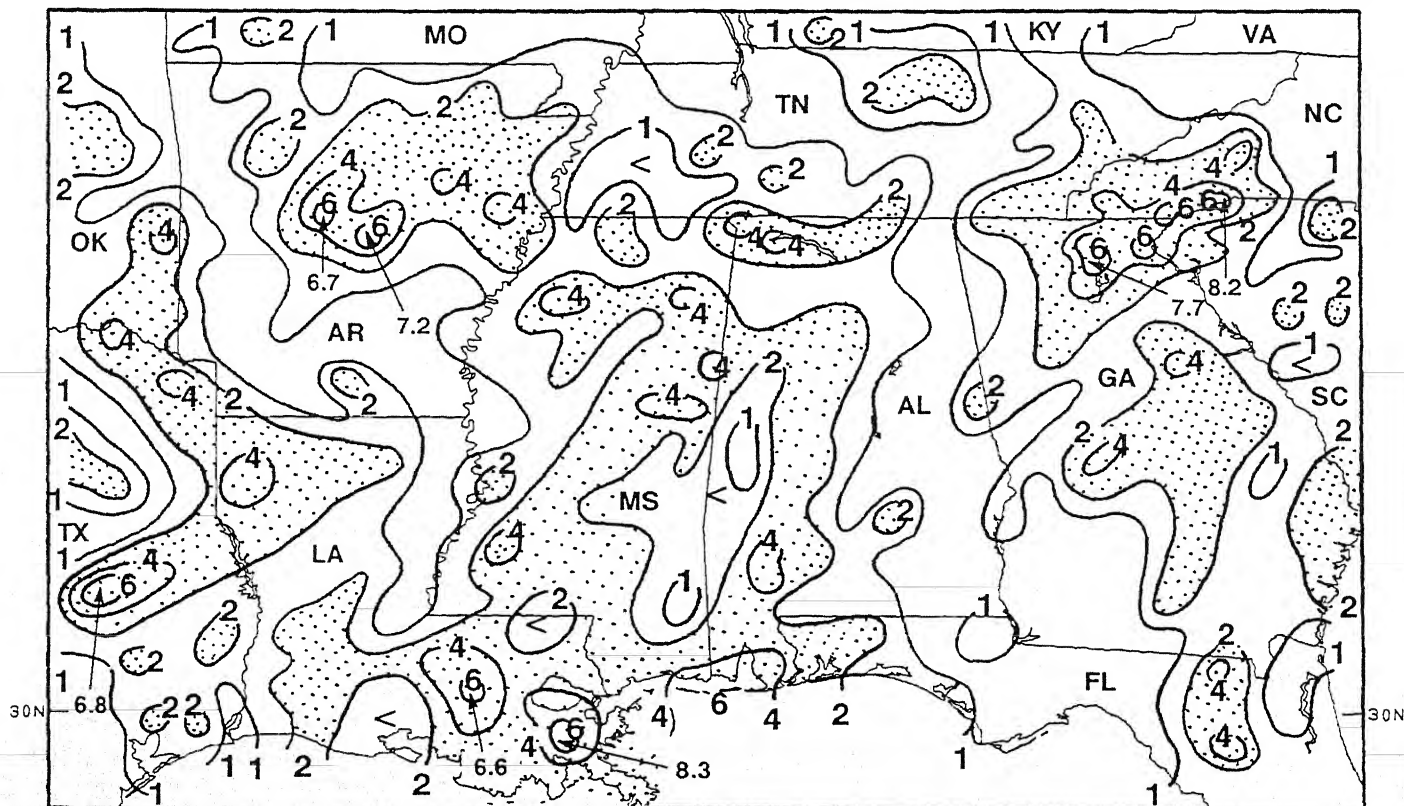
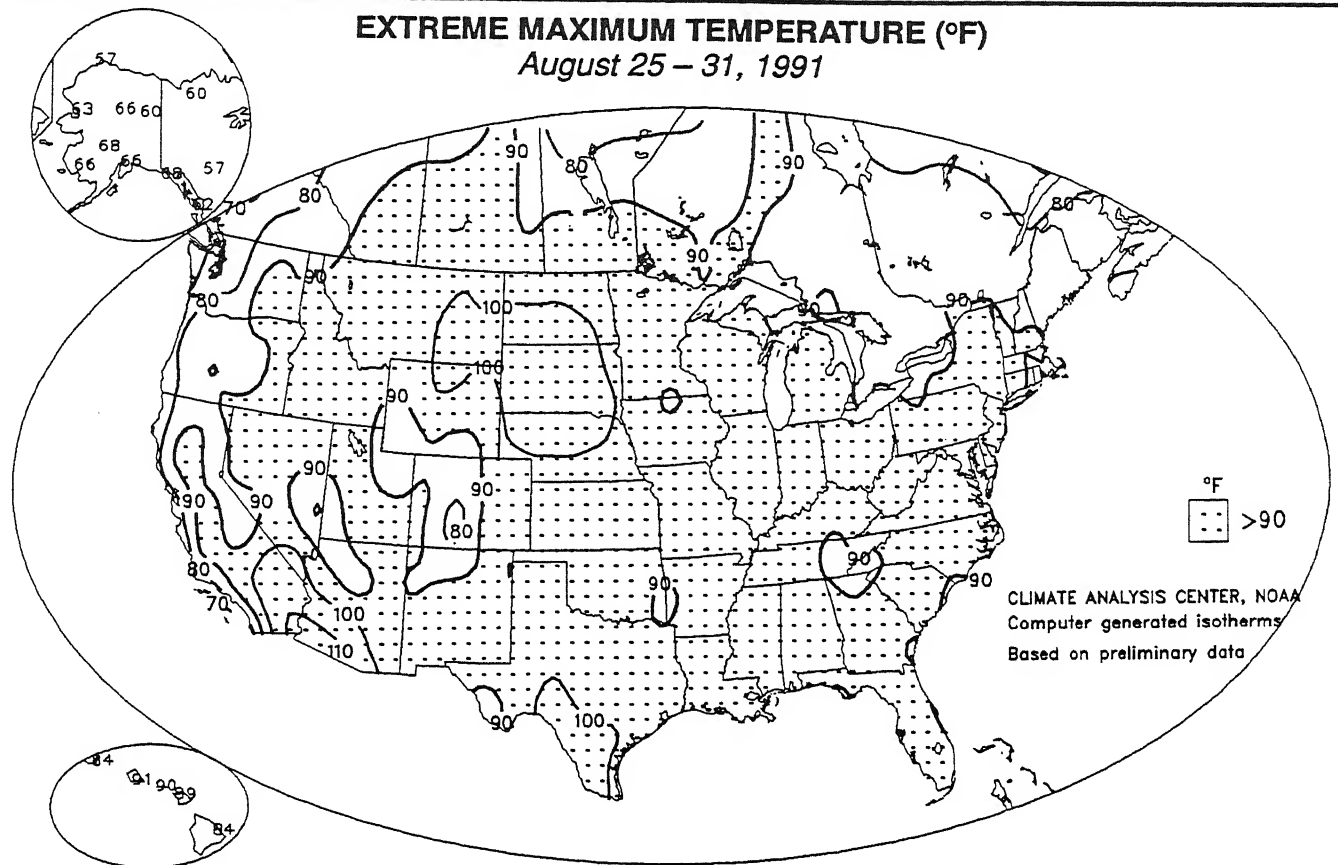


FIGURE 1. Total Precipitation Across the South-Central and Southeastern United States, August 25 - 31, 1991. Isohyets drawn for 1, 2, 4, and 6 inches. Stippled areas received over 2 inches. After several dry weeks introduced short-term moisture deficits to portions of the interior Deep South, thunderstorms brought soaking rains to much of the region. Flash flooding accompanied some of the heavier rains across eastern Texas, central Arkansas, southeastern Louisiana, and the southern Appalachians, where 6.5 to 8.3 inches were measured. In contrast to conditions further northeast, the rainfall was not helpful across eastern Texas and the central Gulf Coast, where abnormally heavy rains have been observed during the past several weeks.

EXTREME MAXIMUM TEMPERATURE (°F)

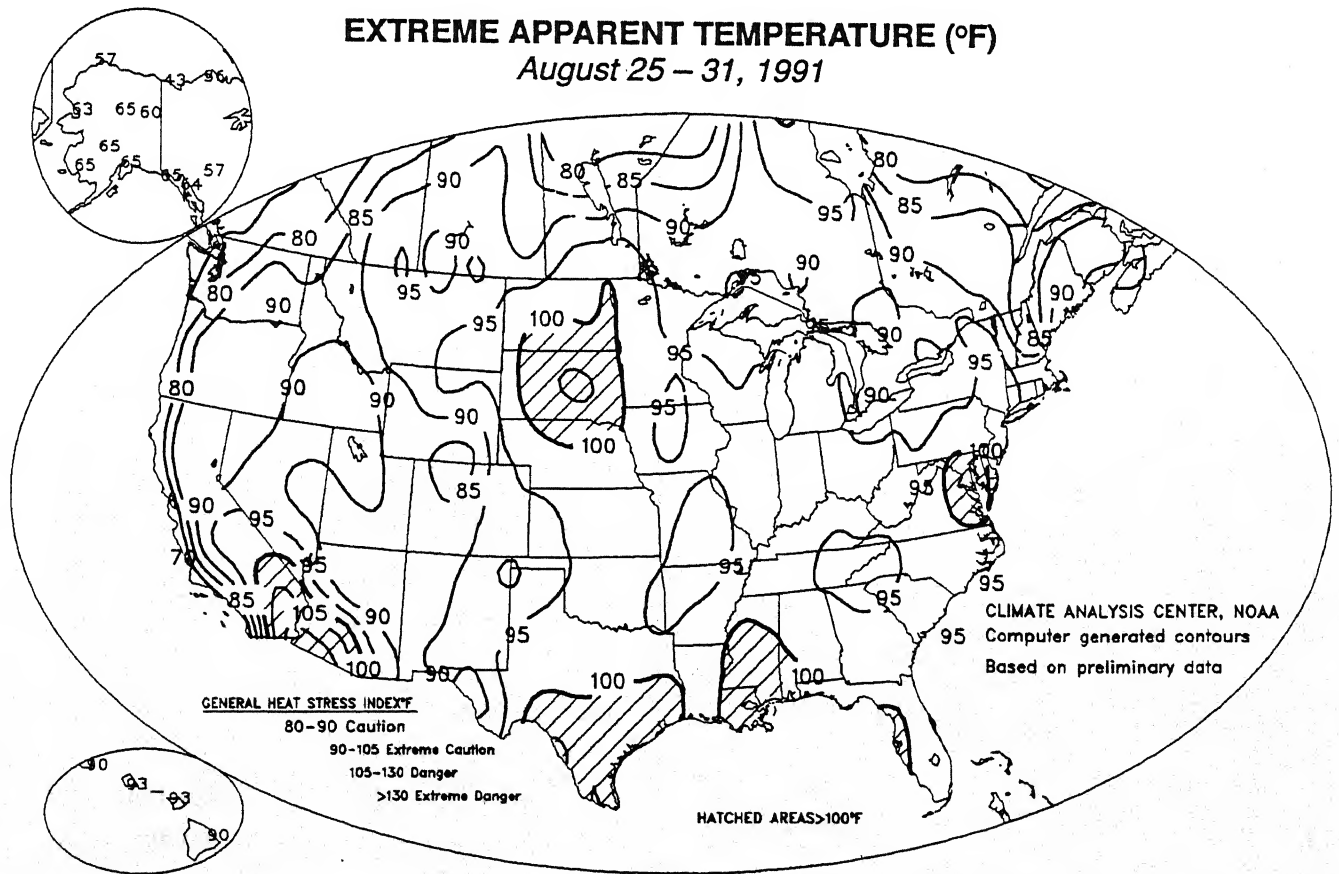
August 25 – 31, 1991



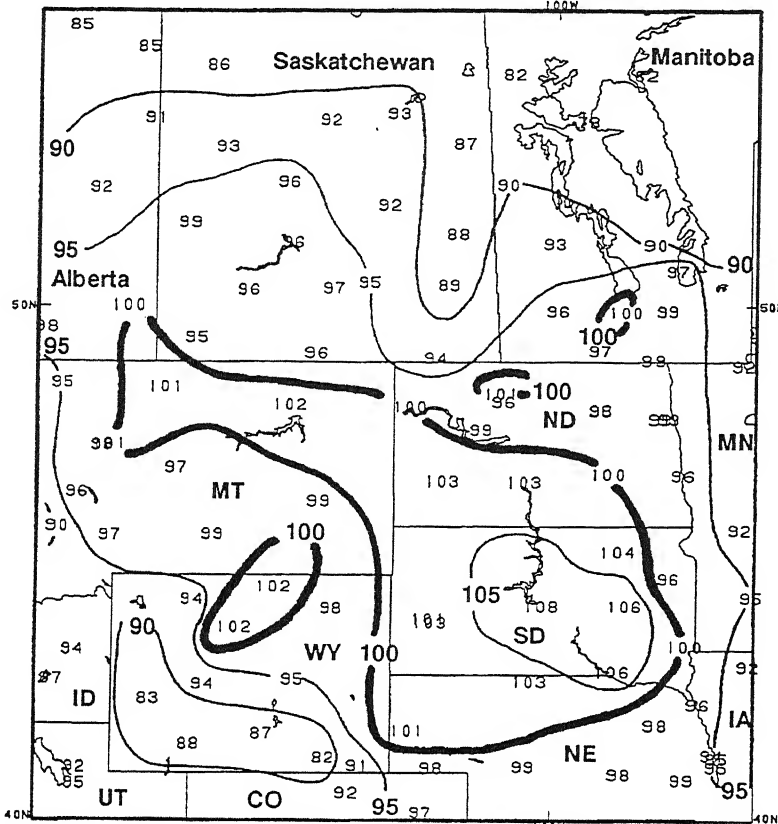
Hot weather baked portions of the north-central U.S. with highs over 100°F recorded from northern Nebraska to eastern Montana, the southern Rio Grande Valley and the desert Southwest (top). In addition, high humidities combined with the heat to produce apparent temperatures over 100°F in parts of the mid-Atlantic, the central and western Gulf Coast, and eastern Texas (bottom).

EXTREME APPARENT TEMPERATURE (°F)

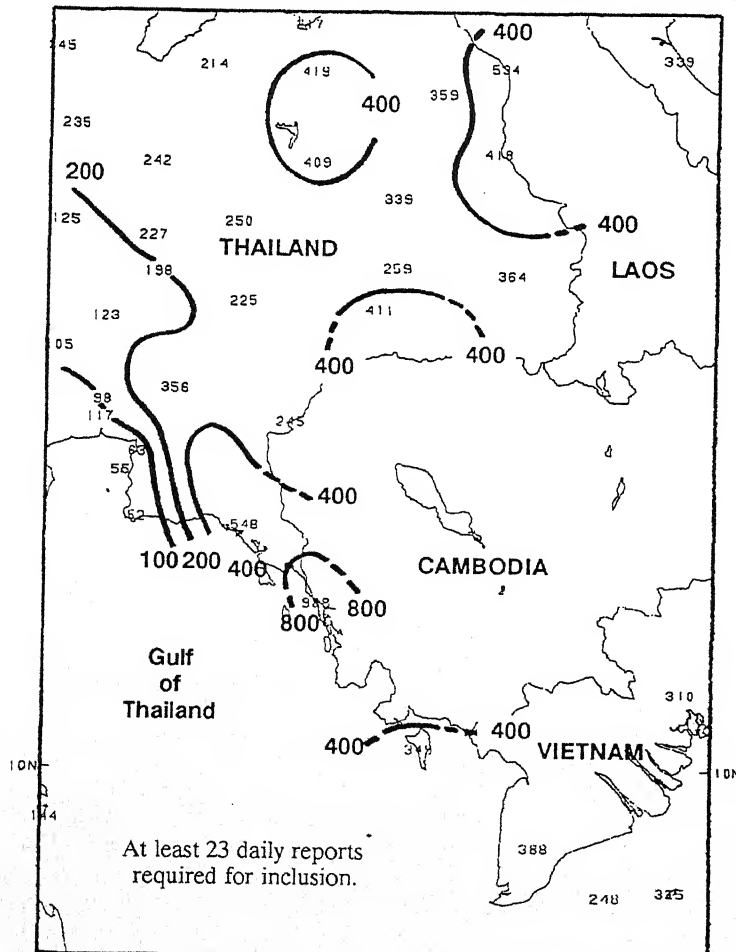
August 25 – 31, 1991



CLIMATE HIGHLIGHTS FEATURES



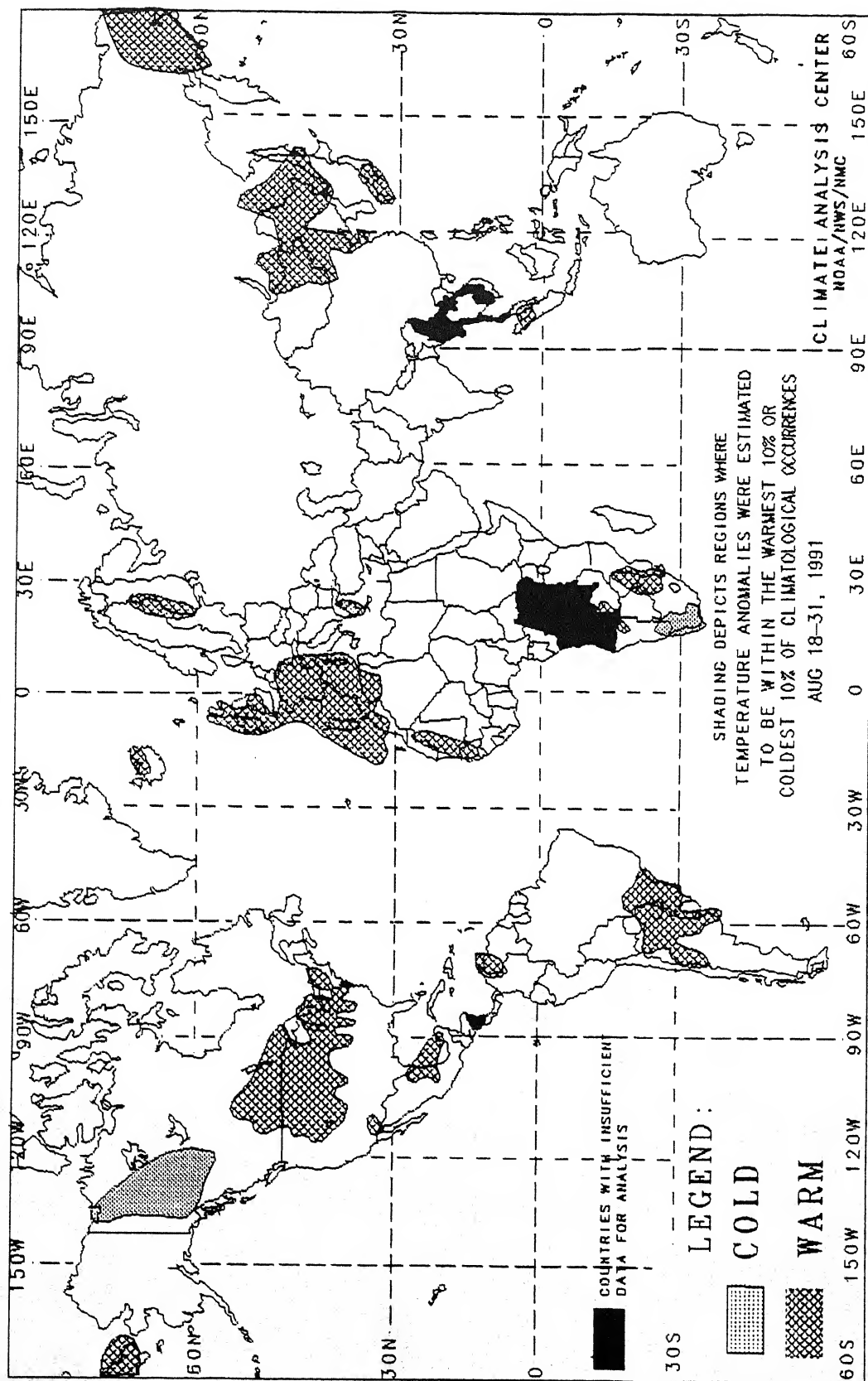
Extreme Maximum Temperatures (°F) Across the North-Central United States and Southern Canadian Prairies, August 25 – 31, 1991. Isotherms drawn for 90°F, 95°F, 100°F, and 105°F only. Hot weather, with highs exceeding 90°F, scorched most of the lower elevations. Blistering heat, with temperatures well into the triple digits, baked the central and southern Dakotas, northwestern Montana, north-central Colorado, and northern Nebraska. Pierre, South Dakota experienced a fifth consecutive daily maximum of 104°F or greater on August 28.



Total Precipitation (mm) across Southeast Asia, August 4 – 31, 1991 (28 Days). Isohyets drawn for 100 mm, 200 mm, 400 mm, and 800 mm only. Devastating floods have damaged nearly 4500 square kilometers of rice paddies and left thousands of families homeless in southern and western Cambodia, according to press reports. Intense precipitation across the region combined with heavy upstream rainfall in the Tonle Sap and along the Mekong River Valley to produce the floods. Although reliable data are lacking in Cambodia, nearly 1000 mm of rain doused extreme southeastern Thailand during April 4 – 31, 1991 while totals of 350 – 530 mm were reported in the western Mekong Valley.

2-WEEK GLOBAL TEMPERATURE ANOMALIES

AUGUST 18 - 31, 1991



The anomalies on this chart are based on approximately 2500 observing stations for which at least 13 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty-four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have resulted in an overestimation of the extent of some warm anomalies.

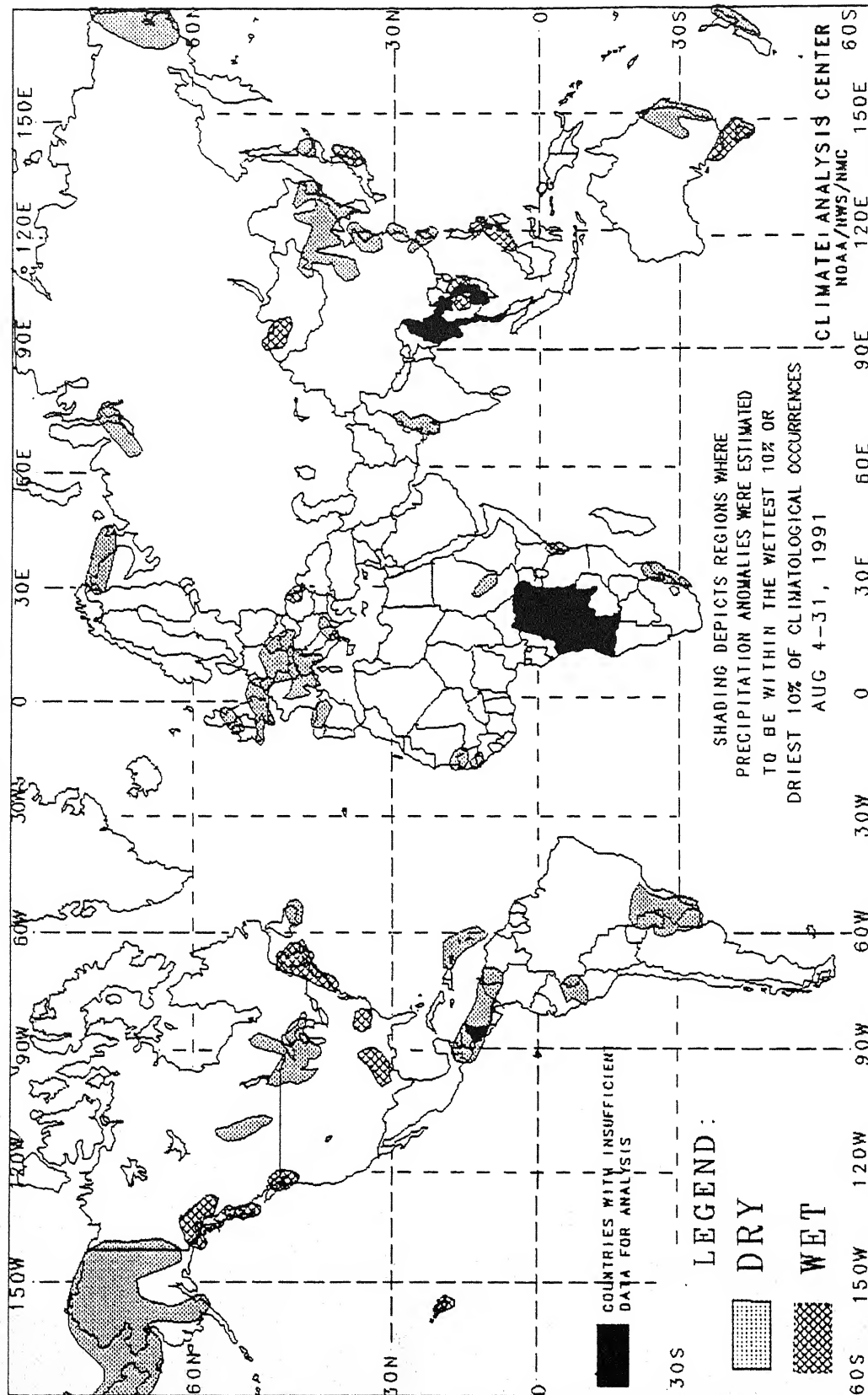
Temperature anomalies are not depicted unless the magnitude of temperature departures from normal exceeds 1.5°C.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

This chart shows general areas of two week temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

4-WEEK GLOBAL PRECIPITATION ANOMALIES

AUGUST 4 - 31, 1991



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the four week period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total four week precipitation exceeds 50 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of four week precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

UPDATE/CORRECTION ON HURRICANE BOB

The discussion on Hurricane Bob contained in the Global Climate Highlights section of Weekly Climate Bulletin #91/34, dated August 24, 1991, referred to an extremely preliminary press report and contained a typographical error. Private property damage in Massachusetts (homes, boats, businesses, etc.) was estimated at \$900 million by the state, not \$90 million. According to the American Insurance Services Group, Hurricane Bob ranks second behind Hurricane Hugo in terms of INSURABLE LOSSES caused by a hurricane in the United States, at \$780 million (\$525 million in Massachusetts, \$115 million in Rhode Island, \$40 million in Connecticut, \$21 million in Maine, and \$4 million in North Carolina. It should be noted that these figures do not include flood losses, which are handled separately by the National Flood Insurance Program). Total damage generated by Bob is now estimated at approximately \$1.5 billion.